4.15 GLOBAL CLIMATE CHANGE

4.15.1 Introduction

Global climate change refers to alterations in weather features which occur across the Earth as a whole, such as temperature, wind patterns, precipitation, and storms. Global temperatures are modulated by naturally occurring atmospheric gases, such as water vapor, carbon dioxide, methane, and nitrous oxide. These gases allow sunlight into the Earth's atmosphere, but prevent radiative heat from escaping into outer space, thus altering the Earth's energy balance in a phenomenon called the greenhouse effect.

4.15.1.1 *Earth's Dynamic Climate*

The global climate is continuously changing, as evidenced by repeated episodes of warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. Scientists have observed, however, an unprecedented increase in the rate of warming in the past 150 years.

This recent warming has coincided with the global Industrial Revolution, which has seen the widespread destruction of forests to accommodate urban centers and agriculture and the use of fossil fuels, primarily burning of coal, oil, and natural gas for energy, which in turn has released substantial amounts of greenhouse gases into the atmosphere. Carbon dioxide accounts for approximately 85% of total emissions, and methane and nitrous oxide account for almost an additional 14%. Concentrations of carbon dioxide in the atmosphere have risen approximately 30% since the Industrial Revolution. Because greenhouse gases persist and mix in the atmosphere, emissions anywhere in the world impact the climate everywhere.

During the past 100 years, average global temperatures have risen by more than one degree Fahrenheit (F). Meteorologists have documented that the past ten years have been the hottest decade since 1850. Warming has not been uniform, with temperatures at the poles experiencing the greatest increase, with up to a 9 degree increase observed in large areas of the Arctic over the 20th century. In response to warming, the growing season has lengthened and trees are flowering earlier; some animal and plant species ranges have been migrating toward higher latitudes and altitudes; plant and animal species adapted to cold temperatures have declined; and species adapted to warm temperatures have increased.

4.15.1.2 *Human Influence on Climate*

The world's leading climate scientists have reached consensus that global climate change is underway, is "very likely" caused by humans, and hotter temperatures and rises in sea level "would continue for centuries," no matter how much humans control future emissions. The latest report of the Intergovernmental Panel on Climate Change (IPCG) – an international group of scientists and representatives of 113 governments – released February 2, 2007,[69] concludes "The widespread warming of the atmosphere and ocean, together with ice-mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone."

[69] (http://www.ipcc.ch/)

The IPCG predicts temperature increase of between two and 11.5 degrees F by the year 2100, with the most likely scenario between 3.2 and 7.1 degrees F. The IPCG report projects sea level rises of seven to 23 inches by the end of the century, with an additional 3.9 to 7.8 inches possible depending upon the rate of polar ice sheets melting from increased warming. The IPCG report states that an increase in hurricane and tropical cyclone strength since 1970 "more likely than not" can be attributed to human-generated greenhouse gases.

According to the 2006 California Climate Action Team Report,[70] the following climate change effects are predicted, based on the IPCG trends described above, the following conditions can be expected in California over the course of the next century:

- A diminishing Sierra snowpack declining by 70% to 90%, threatening the state's water supply;
- Increasing temperatures from 8 to 10.4 degrees F under the higher emission scenarios, leading to a 25 to 35% increase in the number of days ozone pollution levels are exceeded in most urban areas;
- Coastal erosion along the length of California and sea water intrusion into the Sacramento River Delta from a four- to 33-inch rise in sea level. This would exacerbate flooding in already vulnerable regions;
- Increased vulnerability of forests due to pest infestation and increased temperatures;
- Increased challenges for the state's important agriculture industry from water shortages, increasing temperatures, and saltwater intrusion into the Delta; and
- Increased electricity demand, particularly in the hot summer months.

4.15.2 Regulatory Context for Global Climate Change

Global climate change resulting from greenhouse gas emissions is an emerging environmental concern being raised and discussed at the international, national, and statewide level. At each level, agencies are considering strategies to control emissions of gases that contribute to global warming. However, no agency has yet assumed jurisdiction to regulate greenhouse gases and there are no established standards for gauging the significance of greenhouse gas emissions. Neither CEQA nor the CEQA Guidelines provide any methodology for analysis of greenhouse gases.

In the fall of 2006, Governor Schwarzenegger signed AB 32, the global warming bill, into law. The Bill requires the state Air Resources Board (ARB) to adopt regulations by January 1, 2008 to require reporting and verification of statewide greenhouse gas emissions and to monitor and enforce compliance with that program. The bill requires achievement by 2020 of a statewide greenhouse gas emissions limit equivalent to 1990 emissions, and the adoption of rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions.

A pending federal court case, *Massachusetts v. EPA*, brought by 12 states, three cities, and 13 environmental groups is pending before the U.S. Supreme Court. At issue is whether the U.S. Environmental Protection Agency should be required to regulate carbon dioxide and other greenhouse gases as pollutants under the federal Clean Air Act. The US EPA argues it lacks legal authority under the Clean Air Act to regulate greenhouse gases. A decision is expected later in 2007.

Within California, the state Attorney General, in recognition of the significant role of vehicle greenhouse gas emissions, has filed suit against the top six auto companies seeking damages for their vehicles' emissions. The California Attorney General's lawsuit, *People v. General Motors Corp.*, C06-05755, claims that vehicles' greenhouse gas emissions are a "public nuisance," an activity that

[70] http://www.climatechange.ca.gov/climate_action_team/reports/index.html

interferes with public health and safety. The suit claims that emissions from vehicles produced by these companies are a significant cause of climate change and are already contributing to major problems for the state's economy and natural resources, ranging from a decline in the Sierra snowpack to increased pollution and wildlife hazards.

As of February 2007, there are several pending California cases brought under CEQA regarding the discussion of global climate change in EIRs in several jurisdictions. As examples, see *Center for Biological Diversity v. City of Banning,*[71] and *Natural Resources Defense Council v. The Reclamation Board of the Resources Agency*. [72] There is currently no case law, however, for guidance on the methodology and criteria for what constitutes a project impact, individually or cumulatively, to global warming.

4.15.3 CVSP Contributions to Global Climate Change

Given the truly global scope of global climate change, the challenge under CEQA is for a Lead Agency to translate the issue down to the level of a CEQA document for a specific project in a way that is meaningful to the decision making process. Under CEQA, the essential questions are whether a project creates or contributes *to* an environmental impact or is subject to impacts *from* the environment in which it would occur, and what mitigation measures are available to avoid or reduce impacts.

Accordingly, projects can both contribute to global climate change and be exposed to impacts from global climate change, and mitigation measures can be identified to minimize project impacts to and from global climate change. The following discussion describes both conditions and gives a general description of potential impacts associated with the CVSP project.

4.15.3.1 *California Greenhouse Gas Emissions*

To provide a context for CVSP greenhouse gas emissions, it is useful to consider the state of California as a whole. California is a substantial producer of greenhouse gas emissions. As mentioned previously, carbon dioxide accounts for approximately 85% of total emissions, and methane and nitrous oxide account for almost an additional 14%. Each gas contributes to global warming at a different relative rate. Methane has a global warming potential 21 times that of carbon dioxide, while nitrous oxide is 310 times that of the same amount of carbon dioxide.

According to the California Climate Action Team, in 2002, total carbon dioxide emissions in California from fossil fuel combustion were 360 million tons, accounting for approximately seven percent of U.S. emissions from this source. According to the California Energy Commission, California is the second largest emitter of greenhouse gases in the U.S. (trailing only Texas) and the 12th largest in the world. In 2004, California produced 492 million metric tons of total carbon dioxide-equivalent emissions. California has relatively low carbon emissions intensity, however, ranking fourth lowest of the 50 states in carbon dioxide emissions per capita from fossil fuel combustion in 2001. California was also the fifth lowest of the 50 states in carbon dioxide emission from fossil fuel combustion per unit of gross state product in 2001, largely as a result of the state's energy efficiency and renewable energy programs.

[71] RIC460967 (Riverside County Superior Court, filed Nov. 21, 2006)
[72] 06CS-01228 (Sacramento County Superior Court, filed 2006)

4.15.3.2 *CVSP Greenhouse Gas Emissions Impacts*

The primary sources of CVSP greenhouse gas emissions are anticipated to be combustion of fossil fuels from grid-delivered electricity use and from vehicles. An Advanced Recycled Water Treatment Plant, as described in Section 4.16, could someday be located in the CVSP Area. These plants could generate some amount of greenhouse gas emissions associated with emergency back-up generators.[73] No other significant stationary source generators, i.e. fossil-fuel burning power plants, are anticipated in CVSP.

Electricity Use

As described in Chapter 4.12, *Energy*, build-out of the CVSP will consume approximately 500 million kWH of electricity annually. The generation of electricity through combustion of fossil fuels typically yields carbon dioxide, and to a much smaller extent, nitrous oxide and methane. Annual electricity emissions can be calculated using protocols developed by the California Climate Action Registry, a voluntary greenhouse gas reporting entity.[74]

Using Climate Registry protocols that adjust for regional power pool emission factors specific to California, CVSP annual electricity usage of 500 million kWH equates to approximately 183,000 metric tons of carbon dioxide per year. Nitrous oxide electricity use emissions would total approximately 0.84 metric tons per year. Methane emissions would total approximately 1.5 metric tons per year. Accounting for the relative increased global warming potential of these two gases compared to carbon dioxide, these are equivalent to 260 metric tons and 31.5 metric tons of carbon dioxide global warming potential, respectively. The approximate total carbon dioxide-equivalent emissions (including methane and nitrous oxide) from electricity use would be roughly 183,292 metric tons per year.

Vehicle Emissions

To attempt to quantify the CVSP mobile source greenhouse gas emissions, the air quality model used to predict emissions rates of criteria pollutants can also model carbon dioxide emissions resulting from vehicle trips. The URBEMIS-2002 model run calculates the CVSP, with approximately 266,000 daily vehicle trips at build-out, would result in approximately 1,687,000 vehicle miles traveled per day. The carbon dioxide emission rate for a year 2030 vehicle mix is about 515 grams or 1.13 pounds per mile. Daily CVSP total carbon dioxide vehicle emissions would be approximately 862 metric tons per day. Annual emissions would total approximately 314,500 metric tons. Assuming a fleet average of 0.05 gallons/mile for both nitrous oxide and methane, vehicle emissions would total approximately 30.8 metric tons each per year. Accounting for the relative increased global warming potential of these two gases compared to carbon dioxide, these are equivalent to 9,544 metric tons and 646.5 metric tons of carbon dioxide global warming potential, respectively. The approximate total carbon dioxide-equivalent emissions (including methane and nitrous oxide) from vehicle use would be roughly 324,690 metric tons per year.

CVSP Combined Transportation and Electricity Contribution

Using the numbers described above, the combined CVSP greenhouse gas emissions from vehicles and electricity use total approximately 507,982 metric tons per year, or roughly 0.001% of California's total 2004 emissions of 492 million metric tons, which were 7% of U.S. emissions and approximately 12th in the world. These emission projections indicate the majority of CVSP

[73] Bob Wilson, personal communication, City of San José Municipal Water District, March 14, 2007.
[74] www.climateregistry.org.

greenhouse gas emissions are associated with vehicle miles traveled (64%), and to a lesser extent from electricity consumption (36%). As stated above, there is no regulatory standard or guideline by a federal, state, or regional agency against which to measure carbon dioxide, methane, or nitrous oxide emissions to determine whether CVSP emissions would directly or cumulatively result in a significant global climate change impact.

It should be noted that the greenhouse gases generated are related to growth that will occur elsewhere in the region, if not in the Coyote Valley. Therefore, by planning a high-density, mixed use, and pedestrian and transit-oriented community, overall increases in greenhouse gas emissions per capita may be less than they would be with a similar amount of population growth occurring at more remote locations, i.e., in the Central Valley.

TABLE 4.15-1
CVSP GREENHOUSE GAS EMISSIONS*

Source	Carbon Dioxide	Nitrous Oxide	Methane	Total
Electricity Use	183,000	260	31.5	183,292
Vehicle Emissions	314,500	9,544	646.5	324,690
Total	497,500	9,804	678	507,982

* In Metric Tons

Other Emissions Sources

Additional unknown quantities of greenhouse gases would be emitted as part of the CVSP construction process from the manufacture and transport of building materials and the operation of construction equipment.

As described in Chapter 4.6, *Biological Resources*, approximately 2,190 trees were surveyed within the CVSP Development Area, of which at least 888 were ordinance-size. The actual number of trees to be removed remains to be determined pending development details concerning the design and location of public and private developments. Given this uncertainty, no attempt is made at a quantitative analysis of the global climate change effects from CVSP tree removal. At a qualitative level, trees absorb carbon dioxide and produce oxygen, while their shade provides a cooling effect in urban environments. As trees are removed, there would be an interim loss of a decade or more of an important source of carbon dioxide absorption capacity, and loss of cooling from tree canopies. These effects would be mitigated over time as replacement trees matured and provided the above-described beneficial effects.

4.15.4 Impacts to CVSP from Global Climate Change

As previously described, projects can be exposed to impacts from global climate change, and mitigation measures can be identified to minimize project impacts from global climate change. Acknowledging the global climate change trends described above, CEQA requires the CVSP EIR discuss the reasonably foreseeable impacts from warming that can be predicted at a scale meaningful to the level of project decision-making, namely the adoption of a Specific Plan in the Coyote Valley area of southern San José.

Given the climate change predictions for California, it is reasonably foreseeable that temperatures locally in Santa Clara County, the City of San José, and Coyote Valley will increase over the course

of this century by as much as 8 to 10 degrees with or without the CVSP project. This warming could lead to other climate effects within the Coyote Valley including, but not limited to, increased flooding due to increased precipitation and runoff, a decrease in the Sierra snowpack (a major water source), habitat modification/loss, and impacts to sensitive plant and animal species. The CVSP project would not be affected by an increase in sea level given the elevation of the site and its location on the eastern side of the Santa Cruz Mountains.

4.15.5 Strategies to Reduce Greenhouse Gas Emissions

Given the global nature of climate change, the ultimate solution is a national policy addressing greenhouse gas emissions and global climate change, rather than piecemeal state-by-state or city-by-city approaches. A meaningful national policy by the United States, as the world's largest economy and greenhouse gas producer, would likely lead to other nations doing their part. At the local scale of land use decision-making, this is truly a situation where San José can 'think globally, and act locally' and lead by example in adopting policies and programs to limit the production of greenhouse gases associated with the CVSP.

Given the predominant contribution of emissions from vehicles and electricity generation, efforts to reduce CVSP greenhouse gas emissions should focus on reducing vehicle trips and on reducing electricity demand through energy efficient building design and operations, as described below. In addition, the City could prepare a Global Warming Mitigation Program for the CVSP project, describing required efforts to reduce energy consumption. The Program should be updated every five years to incorporate new technology or programs being developed at the state and federal level.

4.15.5.1 *Electricity*

As described in the Coyote Valley Specific Plan text (Section 8, *Infrastructure and Utilities: Energy*), the CVSP encourages solar energy and other non-fossil fuel energy sources. These sources tend to support the energy needs of individual developments; however, during the build-out of the specific plan, locally generated "alternative" sources are encouraged.

The mitigation measures described in Chapter 4.12.4, *Energy,* incorporating Green Building policies (MM ENG-1.1 through MM ENG-1.8) to mitigate impacts associated with electricity and natural gas consumption would reduce greenhouse gas emissions. Public buildings will be constructed to meet a minimum of LEED Silver certification, and private buildings should be strongly encouraged to participate as well.

4.15.5.2 *Vehicle Trips*

The CVSP has been designed to promote non-auto modes of transportation and thereby reduce greenhouse gas emissions. The planned land use intensity/urban form and an extensive network of transit service, trails, and bike routes encourage non-auto trips, such that approximately 12% of CVSP trips will employ a mode other than auto. Nonetheless, as described above, the CVSP will generate approximately 266,000 daily vehicle trips at build-out. The mix of land uses, however, encourages a large degree of internalization of trips (40%) within CVSP, which leads to shorter trip lengths and reduced vehicle emissions for those 40% of vehicle trips that start and end in CVSP, as described in Section 4.2 and Appendix C. In the case of the 60% of trips that originate outside of CVSP, the construction of an employment center in southern Santa Clara County would reduce the lengths of regional commute trips originating to the south of CVSP.

4.15.6 Conclusion Regarding Global Climate Change

Given the overwhelming scope of global climate change, it is not anticipated that a single development project, even one of the relatively large scale of the CVSP, would have an individually discernable effect on global climate change, i.e., that any increase in global temperature or sea level could be attributed to the emissions resulting from a single project. Rather, it is more appropriate to conclude the substantial CVSP greenhouse gas emissions will combine with emissions across California, the U.S., and the globe to cumulatively contribute to global climate change.

Declaring an impact significant or not significant implies some knowledge of incremental effects that is several years away, at best. To determine whether the proposed CVSP project would have a significant impact associated with global climate change, in light of the fact that there exists no numerical threshold for such an impact, would be speculative. For this reason, a determination of significance cannot be made. It should be noted, however, that the project, in mitigating for energy, traffic, and air quality impacts, has been designed to incorporate many of the identified mitigation measures to reduce greenhouse gas emissions.